REMARKS/ARGUMENTS

Claims 1-22 are currently pending in this application. In an Office Action mailed June 22, 2007, the Patent Office objected to claims 1-15 and 18-20.[1] The Patent Office rejected claims 2, 7, 16, 17 and 22. Claim 21 has been allowed. All of the claims have been found to be free of the prior art.

I. Claim to Foreign Priority

The applicants are in the process of obtaining a certified copy of the priority Austrian application 1397/2002. The priority document will be filed subsequently as soon as it is available.

II. Objections to the Claims

The Patent Office has objected to claims 1-15 and 18-20. Claims 1 and 2 were objected to because they recite "codes for." Office Action, page 2. As suggested by the examiner, this language has been changed to read "encodes." Claims 4-7 were objected to because they recite "base" to mean "nucleotide" (applicants assume that the inclusion of claim 8 in this particular objection was an oversight, as claim 8 does not recite the objectionable language). *Id.* As suggested by the examiner, this language has been changed to read "nucleotide." Claims 9-12 were objected to because they recite "coding for." *Id.* As suggested by the examiner, this language has been changed to read "encoding." Claims 18-20 were objected to as depending from rejected claims 16 and 17. Office Action, page 4. As established below, the rejection of claims 16 and 17 can properly be withdrawn, obviating these objections. The claims dependent on claim 1 were objected to as depending from an objected to claim. Office Action, pages 6-7. These objections are obviated by the amendment to claim 1, correcting the noted grammatical error.

In view of the amendments to the claims per the suggestions of the examiner, and the following remarks and arguments, these objections can properly be withdrawn.

III. Claim Rejections

A. 35 U.S.C. § 112, second paragraph

1. The rejections and bases therefore

Claims 2, 7, 16 and 22 have been rejected under 35 U.S.C. § 112, second paragraph as being indefinite. Office Action, page 3. The Patent Office asserts that the phrase "consisting essentially of" recited in claims 2, 7 and 22 is indefinite because it is unclear absent an appropriate definition in the specification. *Id.* The Patent Office asserts that claim 16 is indefinite because it is not clear whether the "host cell" recited in the claims is in the body of a larger organism or is an isolated cell. *Id.*

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[1] The summary of the Office Action indicates that claims 1, 3-6, 8-15, and 18-20 were objected to. However, in the body of the Office Action, the Patent Office also detailed objections to claims 2 and 7. Office Action, page 2. The applicants assume that the Patent Office intended to include claims 2 and 7 among the claims objected to, and respond accordingly.

2. Applicants' response

The applicants respectfully traverse this rejection, and request that it be reconsidered and withdrawn. It is well-established in the law that the criterion for meeting the requirements of § 112, second paragraph is whether the claim reasonably apprises a person having ordinary skill in the art of the scope of the claims, when read in light of the specification. *See, e.g., Amgen, Inc. v. Chugai Pharmaceuticals Co., Ltd.*, 927 F.2d, 1200, 1217, 18 U.S.P.Q.2d 1016 (Fed. Cir. 1991), *cert. denied* 516 U.S. 988 (1991); *LNP Eng'g Plastics, Inc. v. Miller Waste Mills, Inc.*, 275 F.3d 1347, 1358, 61 U.S.P.Q.2d 1193 (Fed. Cir. 2001); *see also*, MPEP (8th ed., rev. 5) § 2173.01. There is no absolute requirement that every term in a claim be specifically defined in the specification, as is implied by the Patent Office's explanation of the basis of this rejection – so long as the meaning of the claim term is ascertainable, the requirements of § 112, second paragraph are satisfied. *See, e.g., Bancorp Services, L.L.C. v. Hartford Life Ins. Co.*, 359 F.3d 1367, 1372, 69 U.S.P.Q.2d 1996 (Fed. Cir. 2004); *W.L. Gore & Assoc. v. Garlock, Inc.*, 721 F.2d 1540, 1558, 220 U.S.Q.P. 2d 303 (Fed. Cir. 1983), *cert. denied,* 469 U.S. 871 (1984); *see also*, MPEP (8th ed., rev. 5) § 2173.02 ("Accordingly, a claim term that is not used or defined in the specification is not indefinite if the meaning of the claim term is discernible."); MPEP § 2173.05(e) (8th ed., rev. 5) ("Obviously, however, the failure to provide explicit antecedent basis for terms does not always render a claim indefinite. If the scope of a claim would be reasonably ascertainable by those skilled in the art, then the claim is not indefinite."). Finally, the term of art "consisting essentially of" is a well-understood transitional phrase used routinely in patent claims, and means that the claimed invention is defined by the recited limitations, and additional limitations only to the extent that they do not materially affect the basic and novel characteristics or function of the claimed invention as delimitated by the expressly recited claim limitations. *See, e.g., PPG Indus. v. Guardian Indus. Corp.,* 156 F.3d 1351, 1355, 48 USPQ2d 1351, 1353-54 (Fed.Cir.1998) ("By using the term 'consisting essentially of' the drafter signals that the invention necessarily includes the listed ingredients and is open to unlisted ingredients that do not materially affect the basic and novel properties of the invention."); *see also*, MPEP (8th ed., rev.5) § 2111.03 ("The transitional phrase "consisting essentially of" limits the scope of a claim to the specified materials or steps and those that do not materially affect the basic and novel characteristic(s)" of the claimed invention.") (citation omitted).

Turning to the rejection of claims 2, 7 and 22, while the specification does not explicitly define a sequence "consisting essentially of" SEQ ID No. 1, 2, etc., the specification, common knowledge in the art, and conventional usage reasonably convey the scope of the claimed subject matter to a person having ordinary skill in the art. A person having ordinary skill in the art would recognize that the scope of claim 2 encompasses nucleic acid molecules that encode the amino acid sequence of SEQ ID No. 1, with the possibility of additional or different nucleotides only to the extent that they do not materially alter the basic and novel characteristics and function of the sequence encoding the protein of SEQ ID No. 1 (*e.g.*, the well-known

examples of so-called "silent" nucleotide substitutions that to not alter the encoded amino acid sequence, substitutions that encode homologous amino acids that do not alter the essential hydrophobic/hydrophilic and/or charge and/or secondary or tertiary structure of the protein, nucleotides encoding introns, leader or signal sequences, transcription control sequences, or transcription enhancer sequences). The protein defined by SEQ ID No. 1 is a protein from *A. chrysogenum* of defined sequence, possessing the property of enabling a host cell transformed with the gene encoding therefore to increase production of cephalosporin C, and additional properties such as acetyl-CoA hydrolase activity. A person having ordinary skill in the art would have no trouble understanding the nature and scope of permissible changes to the claimed nucleic acid sequence, such that the structure and/or function of this protein are not materially change, and it is within the ordinary skill in the art to identify and distinguish non-material changes from material changes in the nucleotide sequence.

A person having ordinary skill in the art would recognize that the scope of claim 7 encompasses nucleic acid molecules having the nucleotide sequence of SEQ ID No. 2, SEQ ID No. 3, or SEQ ID No. 4, with the possibility of additional or different nucleotides only to the extent that they do not materially alter the basic and novel characteristics and functions of the nucleic acids defined by SEQ ID Nos. 2-4 – *i.e.*, do not materially affect the function of encoding a protein expressed therefrom (*see* above). As already noted, a person having ordinary skill in the art would have no trouble understanding the nature and scope of permissible changes to the claimed nucleic acid sequences, and it is within the ordinary skill of the art to identify and distinguish non-material changes from material changes in the nucleotide sequences.

A person having ordinary skill in the art would likewise recognize that the scope of claim 22 encompasses a protein having the amino acid sequence of SEQ ID No. 1, with the possibility of additional or different amino acids only to the extent that they do not materially alter the basic and novel characteristics and function of the protein defined by SEQ ID No. 1 (which are set out in the specification) (*see* above). Examples include substitution by homologous amino acids that do not alter the essential hydrophobic/hydrophilic and/or charge and/or secondary or tertiary structure of the protein, leader or signal sequences, or other sequences removed post-translationally. *See, e.g.*, specification, pages 5, first and second full paragraphs, and page 6, first & fourth full paragraphs. As already noted, a person having ordinary skill in the art would have no trouble understanding the nature and scope of permissible changes to the claimed proteins, and it is within the ordinary skill in the art to identify and distinguish non-material changes from material changes in the protein sequence.

With regard to the rejection of claim 16 as being indefinite as to whether the "host cell" is in the body of a larger organism, the applicants wish to point out that the term "host cell" has very well-established, definite meaning in the art, and thus the scope of claim 16 as a whole would be readily understood by a person having ordinary skill in the art. A "host cell" is understood in the art to mean any cell that is transformed with an exogenous nucleic acid

molecule. Though the Patent Office raises an interesting scientific point as to whether such a host cell might be in the body of a larger organism, as opposed to being grown in culture, this has no bearing on the *clarity* or definiteness of the claim. The claim recites "a host cell," a term with a well-established, definite, and readily understood meaning in the art (a cell transformed with an exogenous nucleic acid molecule). The second paragraph of § 112 is satisfied.

In view of the foregoing, applicants respectfully submit that claims 2, 7, 16 and 22 fully comply with the definiteness requirement of 35 U.S.C. § 112, second paragraph, and that this rejection can properly be withdrawn.

B. 35 U.S.C. § 112, first paragraph, written description

1. The rejections and bases therefore

Claims 2, 7 and 22 have been rejected under 35 U.S.C. § 112, first paragraph, as lacking written description in the specification. Office Action, page 4. The Patent Office asserts that claims 2, 7 and 22 contain new matter, because the specification does not contain the phrase "consisting essentially of." *Id.*

The Patent Office asserts that claims 16-17 are generic and directed to a transformed host and the use of said transformed host for production of cephalosporin C, wherein the host comprises a vector encoding a protein comprising SEQ ID No. 1. Office Action, page 4. According to the Patent Office, while the specification teaches *Acremonium chrysogenum* as a host cell, "[t]he disclosure misses any teaching as to other host cells, microorganisms or not, that after transformation with DNA encoding protein of SEQ ID NO: 1 produce cephalosporin C." *Id.*

2. Applicants' response

The applicants respectfully traverse this rejection, and request that it be reconsidered and withdrawn. The first paragraph of § 112 requires, in part, that "[t]he specification shall contain a written description of the invention, and the manner and process of making and using it ... ." This has been interpreted by the courts as meaning that the specification must "convey with reasonable clarity to those skilled in the art that, as of the filing date sought, he or she was in possession of the invention." *See, e.g., Vas-Cath Inc. v. Mahurkar*, 935 F.2d 1555, 1563-64, 19 U.S.P.Q.2d 1111 (Fed. Cir. 1991). However, this does not mean that the specification must contain *literal* (verbatim) support for the claim language:

> The test for determining compliance with the written description requirement is whether the disclosure of the application as originally filed reasonably conveys to the artisan that the inventor had possession at the time of the later claimed subject matter, rather than the presence or absence of literal support in the specification for the claim language.

In re Kaslow, 707 F.2d 1366, 1375, 217 U.S.P.Q. 1089 (Fed. Cir. 1983); *see also, Fujikawa v. Wattanasin*, 93 F.3d 1559, 1570, 39 U.S.P.Q.2d 1961 (Fed. Cir. 1996) ("*Ipsis verbis* disclosure is not necessary to satisfy the written description requirement of section 112."); *Purdue Pharma*

L.P. v. Faulding Inc., 230 F.3d 1320, 1323, 56 U.S.P.Q.2d 1481 (Fed. Cir. 2000) ("In order to satisfy the written description requirement, the disclosure as originally filed does not have to provide *in haec verba* support for the claimed subject matter at issue.").

With respect to claims 2, 7 and 22, the recitation of a nucleic acid molecule (claims 2 and 7), and a protein (claim 22), "consisting essentially of" specifically-defined sequences is amply supported by the specification disclosure. First, the specification and claims as originally filed recited nucleic acid molecules and proteins "comprising" specified sequences, which would have clearly conveyed to a person having ordinary skill in the art that the inventors had invented the specified nucleic acid molecules and proteins, as well as a range of variations thereof (such as fusion proteins, analogs, homologs, fragments, etc.). S*ee, e.g.*, specification, page 4, fourth full paragraph; pages 5, first and second full paragraphs; page 6, first & fourth full paragraphs; page 9, fifth paragraph; pages 7-8, bridging paragraph; original claims 1, 4, 5, & 21. Second, the specification and claims as originally filed also described as preferred embodiments nucleic acid molecules and proteins that solely or exclusively consist of the specified sequences. *See, e.g.*, specification, page 4, fourth & fifth full paragraphs; page 6, third full paragraph. Finally, the specification and claims as originally filed also describe several examples of nucleic acid molecules and proteins that are intermediate in terms of the range of sequence variation contemplated. *See*, specification, pages 5-6 (nucleic acid molecules according to SEQ ID No. 4 that differ only due to the degeneracy of the genetic code – *i.e.*, still preserve the function of encoding the same protein, or which lack one or more introns, or comprise additional control sequences such as stop codons); page 9, fifth paragraph (fusion proteins wherein the fusion partner is cleaved post-translation). On reading the specification and original claims taken as a whole, "a person of ordinary skill in the art would have understood the inventor to have been in possession of the claimed invention at the time of filing, even if [not] every nuance of the claims is explicitly described in the specification." *In re Alton*, 76 F.3d 1168, 1175, 37 U.S.P.Q.2d 1578 (Fed. Cir. 1996). Therefore, the written description requirement is met with respect to claims 2, 7 and 22.

With respect to claims 16-17, the specification as originally filed expressly describes the invention claimed therein, in this case in the very words recited in the claims:

> The present invention further relates to a host cell which has been transformed with a vector of the invention, which vector comprises the new nucleic acid molecule of the invention and additionally, where appropriate, further nucleic acid molecules, as described above. The host cell is preferably a microorganism, in particular A. chrysogenum. [Specification, page 8, fifth full paragraph.]
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> * * *
>
> A protein of the invention may be produced by culturing a suitable prokaryotic or eukaryotic host cell containing a suitable vector of the invention, ... Examples of suitable prokaryotic host cells in which, in particular, a cDNA of the invention is used are bacterial

> cells, e.g. E. coli; examples of suitable eukaryotic host cells are mammalian cells such as, for example, CHO or BHK cells. [Specification, page 9, last paragraph].

The specification, therefore, describes the invention of claims 16 and 17 in terms that exactly correspond to the language of the claims. This fact establishes beyond a doubt that the invention in possession of the applicants encompassed host cells that are both prokaryotic and eukaryotic, was not limited to the single microorganism *A. chrysogenum*. This is all that the first paragraph of § 112 requires. *Purdue Pharma*, 230 F.3d at 1323, 56 U.S.P.Q2d 1481 ("Put another way, one skilled in the art, reading the original disclosure, must immediately discern the limitation at issue in the claims."). The written description requirement is separate and distinct from the enablement requirement. (*see*, *Vas-Cath*, *supra*), and so to the extent that the Patent Office hold the opinion that the specification does not demonstrate that cells other than *A. chrysogenum* function in the invention (as is evident from the following enablement rejection), this goes to enablement, not written description.

The burden is on the Patent Office to establish a *prima facie* case of unpatentability. *In re Piasecki*, 745 F.2d 1468, 1472, 223 USPQ 785, 788 (Fed. Cir. 1984); *In re Warner*, 379 F.2d 1011, 1017, 154 U.S.P.Q. 173, 178 (C.C.P.A. 1967) ("The Patent Office has the initial duty of supplying the factual basis for its rejection. It may not, because it may doubt that the invention is patentable, resort to speculation, unfounded assumptions or hindsight reconstruction to supply deficiencies in its factual basis.") (emphasis original). As the Court of Claims and Patent Appeals stated in *In re Marzocchi*,

> it is incumbent upon the Patent Office, whenever a rejection on this basis is made, to explain why it doubts the truth or accuracy of any statement in a supporting disclosure and to back up assertions of its own with acceptable evidence or reasoning which is inconsistent with the contested statement. Otherwise, there would be no need for the applicant to go through the trouble and expense for supporting his presumptively accurate disclosure.

439 F.2d 220, 224, 169 U.S.P.Q. 367, 370 (C.C.P.A., 1971). In the present case, the Patent Office has supplied no factual basis (or even any reasoning), making its position speculative. As such, a *prima facie* case of lack of written description with respect to claims 2, 7, 16-17 and 22 has not been established. The applicants respectfully submit that claims 2, 7, 16-18 and 22 fully comply with the written description requirement of 35 U.S.C. § 112, second paragraph, and that this rejection can properly be withdrawn.

B. 35 U.S.C. § 112, first paragraph, enablement

1. The rejections and bases therefore

Claims 16 and 17 have been rejected under 35 U.S.C. § 112, first paragraph, as lacking enablement in the specification. The Patent Office asserts that the specification "does not reasonably provide enablement for the production of cephalosporin C by any host cell transformed with such DNA." Office Action, page 5. The Patent Office characterizes the

claimed invention as "a host cell transformed with DNA encoding protein of SEQ ID NO: 1 with the intention of use of said product for production of cephalosporin C." *Id.* The Patent Office notes that "[a]lthough biotechnological production of cephalosporin C is well developed, not any host cell is capable of producing cephalosporin." Office Action, pages 5-6. The Patent Office asserts that

> The protein of SEQ ID NO: 1 is not disclosed by the applicants as involved in any step of biochemical synthesis of cephalosporin C, because it is tentatively identified as an acetyl-CoA hydrolase (page 6 of the specification). The biosynthesis of cephalosporin involves several steps, and if a host cell, by nature or by earlier engineering, does not produce the enzymes necessary for every step of the biosynthesis of cephalosporin C, introducing a DNA encoding SEQ ID NO: 1 will not cause production of that antibiotic."

Office Action, page 6. The Patent Office concludes that, because the specification does not provide "working examples, and sufficient guidance regarding the feature of other host cells," it does not enable a person having ordinary skill in the art to make and use the claimed invention "in a manner reasonably correlated with the scope of the claims." *Id.*

2. Applicants' response

The applicants respectfully traverse this rejection, and request that it be reconsidered and withdrawn. First, the characterization of the invention of claims 16 and 17 by the Patent Office as being "a host cell transformed with DNA encoding protein of SEQ ID NO: 1 with the intention of use of said product for production of cephalosporin C" (Office Action, page 5) is incomplete. As stated in the specification, the invention relates to transformation of host cells with the intention of *increasing* the production potential of the host cell, either prokaryotic or eukaryotic, for example, in addition to *A. chrysogenum*, bacterial cells such as *E. coli* and mammalian cells such as CHO and BHK cells. Specification, page 1 ("Strategies for identifying further genes with *production-increasing potential* are therefore of great importance.); pages 1-2 ("It is thus an object of the present invention to provide a nucleic acid and vectors which code for a new protein from A. chrysogenum and can be used for transformation of an A. chrysogenum host cell so that this host cell is capable of providing cephalosporin C *in good yields*."); page 9 ("A protein of the invention may be produced by culturing *a suitable prokaryotic or eukaryotic host cell* containing a suitable vector of the invention ...") (all emphasis added).

Second, the Patent Office has not supported a *prima facie* case for the unpatentability of claims 16 and 17 for lack of enablement. As noted above, the burden is on the Patent Office to establish a *prima facie* case of unpatentability, which must be supported by acceptable evidence or reasoning. *Piasecki, Marzocchi, supra.* To be enabling under § 112, a patent must contain a description that enables one skilled in the art to make and use the claimed invention. *Raytheon Co. v. Roper Corp.*, 724 F.2d 951, 960, 220 U.S.P.Q. 592, 599 (Fed. Cir. 1983). That some experimentation is necessary does not preclude enablement, so long as the amount of experimentation is not unduly extensive. *See, e.g., W.L. Gore*, 721 F.2d at 1557, 220 U.S.P.Q.

at 316; *In re Angstadt*, 537 F.2d 498, 503, 190 U.S.P.Q. 214, 218 (CCPA 1976). There is no requirement to describe that which is already known in the art. *In re Wands*, 858 F.2d 731, 734 & 737, 8 U.S.P.Q.2d 1400, 1404 (Fed. Cir. 1988) ("A patent need not disclose what is well known in the art. ... The key word is 'undue', not 'experimentation.'"); *Spectra-Physics, Inc. v. Coherent, Inc.*, 827 F.2d 1524, 1534; 3 U.S.P.Q.2d 1737 (Fed. Cir. 1987), *cert. denied*, 484 U.S. 954 (1987) ("A patent need not teach, and preferably omits, what is well known in the art.").

The Patent Office has not provided acceptable evidence or reasoning to support its conclusion that the full scope of claims 16 and 17 is not enabled. While the Office Action sets out the *Wands* factors, these are not applied to the claims. In other words, Patent Office has provided no acceptable evidence or reasoning that indicates *how* or *why* a person having ordinary skill in the art would not be able to practice the full scope of the inventions of claims 16 and 17 without resort to unreasonable experimentation. The Patent Office's argument that the claims lack enablement because not every host cell contains all of the enzymes necessary for biosynthesis of cephalosporin C, such that the mere introduction of a nucleic acid molecule encoding a protein according to SEQ ID No. 1 "will not cause production of that antibiotic," is not sufficient because the specification clearly conveys that the invention relates to increasing production, or providing good yields, of cephalosporin C in cells already capable of producing it, either by nature or by engineering. *See*, specification pages 1-2 and 9. As the Patent Office notes, the biotechnological production of cephalosporin C is well developed in the art. Office Action, pages 5-6.

Furthermore, techniques of transforming a very wide variety of prokaryotic and eukaryotic cells with even multiple genes, and screening the resulting transformants for the desired properties, had become a matter of routine experimentation as of the priority date of the present application. Thus, a person having ordinary skill in the art could readily identify and select cells capable of producing cephalosporin C,[2] or even genetically modify cells to produce cephalosporin C, for use in the invention of claims 16 and 17, and could readily determine the level of production of cephalosporin C by the resulting transformants.[3]

Because the Patent Office has failed to provide acceptable evidence or reasoning to support its contention that claims 16 and 17 lack enablement, it has no me its burden to establish a *prima facie* case of lack of enablement with respect to those claims. The applicants respectfully submit that claims 2, 7, 16-18 and 22 fully comply with the enablement requirement of 35 U.S.C. § 112, first paragraph, and that this rejection can properly be withdrawn.

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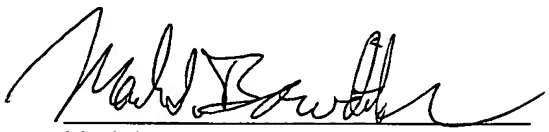
[2] For example, a brief search on the American Type Culture Collection web-site (www.ATCC.org) for the term "cephalosporin C" quickly located five bacterial strains (ATCC 14648, 14650, 14696 and 53594) and seven fungi/yeast strains (in addition to eleven strains of *A. chrysogenum*) that produce cephalosporin C.

[3] *See, e.g.*, Maniatis et al., *Molecular Cloning – a Laboratory Manual* (1982) Cold Spring Harbor Laboratory, Cold Spring Harbor, New York (referenced in the specification at page 5, first full paragraph).

CONCLUSION

In view of the present amendments to the claims, and the foregoing remarks, the applicants respectfully submit that the claims are in condition for allowance, and request withdrawal of the pending claim objections and rejections. Favorable action is earnestly solicited.

Respectfully submitted,



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